

## Use of Tape Strips to Detect Immune and Barrier Abnormalities in the Skin of Children With Early-Onset Atopic Dermatitis

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**Background:** Skin biopsies, the gold standard for biomarker analysis, are not feasible in children. Tape-stripping is a minimally invasive, non-scarring approach towards target and prediction discovery in AD children.

**Objective:** To explore using tape-strips to identify skin biomarkers that can serve as a surrogate to whole tissue biopsies.

**Methods:** Moderate-to-severe AD patients and controls were recruited from the Dermatology clinics at Ann & Robert H. Lurie Children's Hospital of Chicago using an IRB-approved protocol. Sixteen tape-strips were collected from nonlesional and lesional skin of 21 AD children (<5yo, <6mo from onset) and 30 healthy children between January 2016 and April 2018. Gene and protein expression were evaluated using qRT-PCR and immunohistochemistry, respectively. We identified a large panel of AD-associated immune and barrier biomarkers in tape-strips from early-onset AD, which reflect clinical severity.

**Results:** Seventy-seven of 79 evaluated immune and barrier genes were detected (97% gene detection rate) in tape-strips from 70/71 subjects (99% sample detection rate), with 53/79 markers significantly different between lesional/nonlesional AD versus controls. Th2 (IL-4/IL-13/CCL17/CCL26), and Th17/Th22 (IL-19/IL-36G/S100As) genes were significantly increased in lesional and nonlesional AD versus normal tape-strips, with parallel decreases in epidermal barrier products (FLG/CLDN23/FA2H,) and negative immune regulators (IL-34/IL-37;  $p < 0.05$ ). Significant correlations were found between Th2 (IL-33/IL-4R) and Th17/Th22 (IL-36G/S100As) products in lesional/nonlesional AD skin and disease severity (SCORAD/EASI/pruritus) or transepidermal-water-loss (TEWL).

**Conclusion:** Tape-strips provide a minimally invasive approach to evaluate AD-associated cutaneous biomarkers, track therapeutic response, and predict future course and comorbidities.

Previously submitted to Tape-strips provide a minimally invasive approach to evaluate AD-associated cutaneous biomarkers, track therapeutic response, and predict future course and comorbidities.

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